

Remarks/Arguments

Claims 1-4 and 6-11 are pending. The claims have been amended to more clearly and distinctly claim the subject matter that applicants regard as their invention. No new matter is believed to be added by the present amendment.

Support for amended claim 1 is provided in, for example, page 7, lines 4-12 and page 8, lines 28-32. Support for amended claim 2 is provided in, for example, page 7, lines 20-24. Support for amended claim 3 is provided in, for example, page 12, line 36 to page 13, line 13. Support for amended claim 6 is provided in, for example, the original claim 8 and in the specification page 7, lines 4-12 and page 8, lines 28-32. Claim 7 is amended to include some features previously recited in claim 8. Claim 8 is amended to delete the limitations that are now recited in claims 6 and 7. Claims 10 and 11 are amended to add limitations recited in original claims 7 and 8.

Claim 8 has been indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Regarding the objection to the claims, the preambles of the claims have been amended as required. Regarding the objection to claim 4, the claim has been amended to delete the reference to claim 2 and add a limitation recited in original claim 2.

Rejection of claims 1, 3, and 6 under 35 USC 102(b) as being anticipated by Cooklev (US Pat No 6359998)

Applicants submit that for the reasons discussed below Cooklev fails to disclose all of the limitations of amended claims 1, 3 and 6, and thus the subject claims are not anticipated under 35 USC 102(b) by Cooklev.

Cooklev generally relates to a method for watermarking digital data and for verifying the watermarked data. However, whereas the present invention is directed to the generation of the watermark data, i.e., the data to be inserted as "watermark" in the original data, Cooklev is directed to the transformation of the original data to be watermarked.

Amended claim 1 recites:

- a) generating, from said data (x), a **modulation sequence (m) representing the maximum amount of noise which can be added to said data,**
- b) **supplying a pseudo random noise sequence (v) to the input of a filter with predefined impulse response (h);**
- c) multiplying said filtered pseudo noise sequence (w) with said modulation sequence; and
- d) **adding the filtered pseudo noise sequence (w) multiplied by the modulation sequence to said data.** (emphasis added)

Applicants submit that Cooklev fails to disclose or suggest at least the above-emphasized features of amended claim 1.

In Cooklev, the process for embedding a watermark (illustrated in Fig. 4) is disclosed in col. 11, line 6- col. 12, line 5. The three first steps 56, 58 and 60 relate to performing the wavelet transform of the original digital data 50. Then a watermark 54 (in Fig. 3) is inserted into the transformed digital data. The insertion is made at the level of the wavelet coefficients and the *"watermark 54 may be implemented as a sequence of random numbers or may be implemented as a predetermined sequence, such as an ASCII text string, or a combination such as an ASCII name of a business entity followed by a sequential identifier such as a particular serial number or user identification number"* (see col. 11, lines 62-67). More precisely, the insertion process is implemented *"by modulating all wavelet coefficients using bidirectional or unidirectional coding according to the predetermined binary sequence of watermark 54"* (see col. 11, lines 47-51). Then, an inverse wavelet transform is performed (step 64) to obtain the watermarked data.

Nowhere does Cooklev disclose or suggest the steps for generating the watermark data inserted into the original data as recited in amended claim 1. That is, the watermark data is a filtered pseudo noise sequence obtained by supplying a pseudo random noise sequence to a filter with predefined impulse response. This filtered pseudo noise sequence is multiplied by a modulation sequence, representing the maximum amount of noise, which can be added to the original data in a manner imperceptible for a user, before being added to the data. Thus, Cooklev fails to disclose or suggest any of the steps a) to d) of amended claim 1.

Regarding step a), the only mention of "modulation" in Cooklev (in col. 11, line 49) relates to incrementing or decrementing wavelet coefficients in accordance

with the binary sequence of watermark 54 (see col. 11, lines 47-58). Nothing in Cooklev teaches generating from the original digital data 50 a modulation sequence representing the maximum amount of noise, which can be added to the data.

Regarding step b), the Office Action cites col. 9, lines 50-54 as anticipating “supplying a pseudo random noise sequence” and col. 7, lines 57-65 and col. 8, line 29 as anticipating “to the input of a filter with predefined impulse response (h)”. Although the cited portions of Cooklev may include terms similar to that used in the claims, an examination of the cited portions reveals that the teachings therein fail to disclose the subject claim limitations as alleged by the Office Action. Col. 9, lines 50-54 appears to be cited because the portion includes the words “pseudo-noise frequency response.” However, that portion merely mentions that the filters used in the system display a pseudo-noise frequency response. Col. 7, lines 57-65 merely mentions that in digital signal processing applications, two channel orthogonal FIR filter banks are widely used. Col. 8, line 29 is merely a portion of a sentence and only appears to be cited because the portion contains the words “impulse response $h_0[n]$.” However, none of the cited portions individually, or taken together, disclose or suggest supplying a pseudo random noise sequence to the input of a filter with a predefined impulse response.

Regarding steps c) and d), Cooklev also fails to disclose or suggest multiplying the filtered pseudo noise sequence obtained in step b) with the modulation sequence generated at step a) and then adding the result of the multiplication to the original data.

In view of the above, applicants submit that Cooklev fails to teach or suggest all of the limitations recited in amended claim 1, and as such, amended claim 1 is not anticipated by Cooklev.

Amended claim 3 recites:

- i) **performing a spectral analysis of said data;**
- ii) **estimating therefrom whether said data include a pseudo noise sequence which has been filtered by a filter with predefined spectral response $H(f)$; and**
- iii) deducing from said estimation the presence of said watermark.
(emphasis added)

Applicants submit that Cooklev fails to disclose or suggest the above-emphasized limitations of amended claim 3.

The Office Action cites col. 18, lines 29-33 as anticipating step i) and col. 9, lines 50-58 as anticipating step ii). Again, an examination of the cited portions reveals that the teachings therein simply fail to disclose or suggest the subject claim limitations as alleged. Col. 18, lines 29-33 mention the benefit associated with the described spread-spectrum based technique. Col. 9, lines 50-58 mention filter displaying pseudo-noise frequency response and the use of a particular sequence. None of the cited portions remotely disclose or suggest the subject claim limitations. Nothing is mentioned about performing a spectral analysis of the data received (i.e. the data in which the presence – or not – of the watermark is to be detected) and then, estimating from this spectral analysis whether the received data include a pseudo noise sequence which has been filtered by a filter with predefined spectral response.

In view of the above, applicants submit that Cooklev fails to disclose or suggest all of the limitations of amended claim 3, and thus, claim 3 is not anticipated by Cooklev.

Amended claim 6 recites limitations similar to those discussed with respect to amended claim 1 in apparatus form, and is believed to be not anticipated by Cooklev for at least the same reasons as those applied to claim 1.

Rejection of claims 2, 4, and 7 under 35 USC 103(a) as being unpatentable over Cooklev in view of Mansour (US Pat No 6353637)

Mansour is cited as teaching pseudo random interleaving and inverse interleaving, and the Office Action alleges that it would be obvious to combine the teachings of Mansour with Cooklev to derive the subject matter of claims 2, 4, and 7. However, applicants submit that even if the alleged teachings of Mansour are combined with Cooklev as suggested, the suggested combination fails to cure the defect of Cooklev as applied to claims 1, 3 and 6, and thus, claims 2, 4, and 7 are patentably distinguishable over the suggested combination.

**Rejection of claim 9 under 35 USC 102(e) as being anticipated by Lee et al
(US Pat No 5901178)**

Applicants submit that for the reasons discussed below amended claim 9 is not anticipated by Lee et al.

Lee et al. discloses a method for inserting auxiliary data (corresponding to a watermark) in an audio or video signal in an imperceptible manner. The first passage cited by the Examiner, col. 7, lines 45-48 explains how to obtain "spectral envelope (i.e. power spectrum) information" from an audio or video signal. The two other passages cited by the Examiner mention "hypotheses" that "have to be tested" (in col. 16, lines 60-67) and "filtered pseudo-noise sequences $SP_0, SP_1, \dots, SP_{N-1}$ " in col. 15, lines 53-61

Even if these excerpts of Lee et al. contain some words similar to the ones used in claim 9, they do not disclose or suggest:

"means of likelihood testing of hypotheses so as to estimate whether said data include a pseudo noise sequence which has been filtered by a filter with predefined spectral response ($H(f)$); and means for deducing from said estimation the presence of said watermark"

In Lee et al. decoder 368 (shown in Fig. 6 and disclosed in col. 15, line 30 to col. 16, line 17) is provided for recovering auxiliary data from audio and video signals. The signal received at input 600 of the decoder is first demultiplexed and then transmitted to an inverse quantizer 610 which provides subband samples $SM'_0, SM'_1, \dots, SM'_{N-1}$ to a normalizer 614 (see col. 15, lines 33-42). The normalized subband samples $SS'_0, SS'_1, \dots, SS'_{N-1}$ of the received signal are then combined with filtered pseudo-noise (PN) sequences $SP_0, SP_1, \dots, SP_{N-1}$ (see col. 15, lines 48-52) to obtain combined subband samples $SSP'_0, SSP'_1, \dots, SSP'_{N-1}$ which are provided to integrators 650 – 656 (see col. 15, lines 64-67) to obtain "despread auxiliary data samples $SC_0, SC_1, \dots, SC_{N-1}$ " which are summed across the N subbands to recover the encoded auxiliary data 662 (see col. 16, lines 9-12).

It can be deduced from the above explanation that the decoder of Lee et al. does not contain means to estimate whether the received data includes a pseudo noise sequence which has been filtered by a filter with predefined spectral response. In contrast to the present invention, in Lee et al., samples of the


received signal are combined with filtered pseudo-noise sequences. In view of the above, applicants submit that nowhere does Lee disclose or suggest all of the limitations of amended claim 9, and thus, amended claim 9 is not anticipated by the teachings of Lee et al.

Rejection of claims 10 and 11 under 35 USC 103(a) as being unpatentable over Lee in view of Mansour (US Pat No 6353637)

Mansour is cited as teaching pseudo random interleaving and inverse interleaving, and the Office Action alleges that it would be obvious to combine the teachings of Mansour with Lee to derive the subject matter of claims 10 and 11. However, applicants submit that even if the alleged teachings of Mansour are combined with Lee as suggested, the suggested combination fails to cure the defect of Lee as applied to claim 9, and thus, claims 10 and 11, which depend from claim 9, are patentably distinguishable over the suggested combination.

Having fully addressed the Examiner's rejections it is believed that, in view of the preceding amendments and remarks, this application stands in condition for allowance. Accordingly then, reconsideration and allowance are respectfully solicited. If, however, the Examiner is of the opinion that such action cannot be taken, the Examiner is invited to contact the applicant's attorney at (609) 734-6815, so that a mutually convenient date and time for a telephonic interview may be scheduled.

Respectfully submitted,
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